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Implementation & Analysis of AWG as A Mux / Dmux at the WDM PON System

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Abstract: PON (PASSIVE OPTICAL NETWORK) is going to be one of the long run demands of the tele-communication system. The implementation of the WDM-PON along side the AWG is completed rigorously within the system. The AWG is employed in both of the transmitter and the receiver aspect, as a multiplexer and demultiplexer. Our set-up model consists of the both up-stream and the down-stream data transmission. Within the down- stream AWG multiplex the signal and behaves sort of a multiplexer at the OLT aspect and demultiplex the signal at the ONU aspect. And similar is the case with the up-stream communication system. We tend to developed analytical model for learning the impact of the transmission impartment moreover as the AWG characteristics on the BER performance of the WDMPON by incorporating the novel spectral-to-spectral domain transformation technique. The very main thought of the planned model is the AWG. The power being captured by the output port of the AWG isn't only based on the Gaussian focal field pattern however also to the facility spill over the adjacent ports. All the results square measure strongly supported with the assistance of the alphabetic character issue and the eye diagram which square measure being dead from the BER analyser at the receiver part of the originated model. At the analysis section the plotting of the different parameter is also incontestable.

INDEX TERMS: WDMPON; Arrayed-waveguide grating; Gaussian focal field; Spectral-to-spatial transformation; Laser line-width; Beat noise; Diffraction order

Introduction: As fundamentals, wavelength division multiplexing (WDM) PON provides an independent wavelength channel to each| user in each communication direction [2]. The WDM PON is usually classified in the next-generation PON two (NGPON2) family, and so it said to plug after the forthcoming NGPON1 generation [6][7]. However, AN increasing amount of WDM PON systems are commercially accessible which are pronto providing a strong various to GPON or its successors [9] [5]. The common terminology is optical line termination (OLT) and optical network termination (ONT) for the instrumentality at the central and user-side [3][4]. AWG are crucial for wavelength multiplexing and de-multiplexing in WDM-based systems [1]. These AWGs are supported element PLC technology [1]. Several of them are a thermal, meaning they are doing not require temperature control [8], whereas the others have internal temperature control, typically thermoelectrically coolers (TECs)

Setup Model: The setup model of the work is incontestable below the entire model consists of 4 distinct AWG 2 behaving as a multiplexer and 2 as a demultiplexer. The model is intended for the each of the up- and-downstream transmission consisting of the four OLT and ONU. The AWG muxed signal is allowed to go through the perfect circulator before and when it passes through the optical fibre. When demultiplexing the signal the ultimate retrieval of the signal is finished. The similar is that the case of the upstream except the employment of the RSOA at the receiver facet.

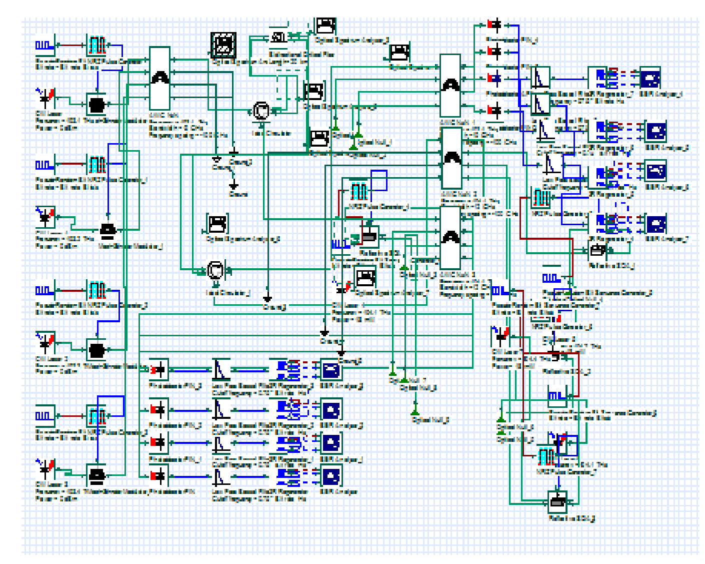


Fig. No. 1

Result and Discussion: As elaborate within the previous chapter that system consists of primarily 3 distinct components first transmitter half second transmission link half and last however not the smallest amount receiver half. Our result's totally involved with these components. It's conjointly noted that during this theoretical conception we've got neglected varied sensible side like transmitter and receiver sub-career then on. Solely those parameters are taken into concern that directly affects the optical information transmission. Some assumption also is created within the method. Analysis is totally supported the attention diagram and also the varied plotting between the assorted parameters.

Spectrum of Multiplexed & Received signal: The undersigned Figure six.2 represents the spectrum plot for the multiplexed signals at the baccalaureate the optical spectrum analyzer demonstrate the signal that is being transmitted

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once being multiplexed by the AWG. Once the signal is transmitted through the glass fiber a number of the additional peaks emerge at the receiver facet. It's clear that some noise square measure gift with the info signals however we have a tendency to are becoming equal peak power at wavelengths at that we've modulated our signals i.e. from 1528 to1577.86 nm. alongside these frequency vary we have a tendency to also are obtaining a additional vary of the frequency wings being incontestable with the inexperienced circle that is that the results of the four wave combination .the terribly initial 2 diagram is of the multiplexed and pre multiplexed signal of the downstream transmission wherever because the next 2 signal is of the upstream transmission. The pre multiplexed signal of each the case square measure affected by the four wave combination.

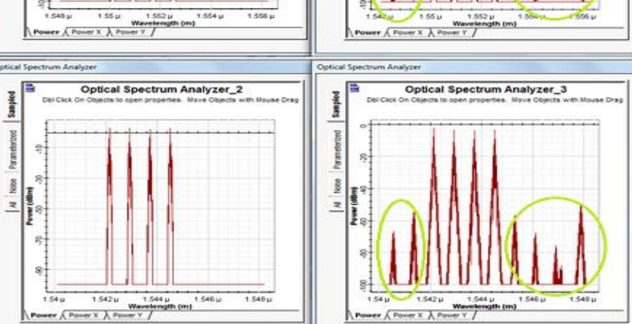


Fig. No. 2

Analytical study based on Q factor V/S bandwidth of the setup model for down stream

As AWG is employed as a mux and demux at the each facet of the OLT and ONU within the set up-model therefore this analysis is completely supported the modification on the information measure of the AWG thereto of its have an effect on the performance of the standard issue of the set-up model. Fig. No () shows the plotting between the 2 parameters that's the information measure (AWG demux) and therefore the alphabetic character issue of the downstream transmission. From the higher than plotting it's clear that the wrt the information measure the worth of the alphabetic character issue changes. The utmost price of the alphabetic character issue is received at the twenty rate because it is rounded with the red circle within the diagram for all four channels of the model wherever as for remainder of the worth the alphabetic character issue decreases.

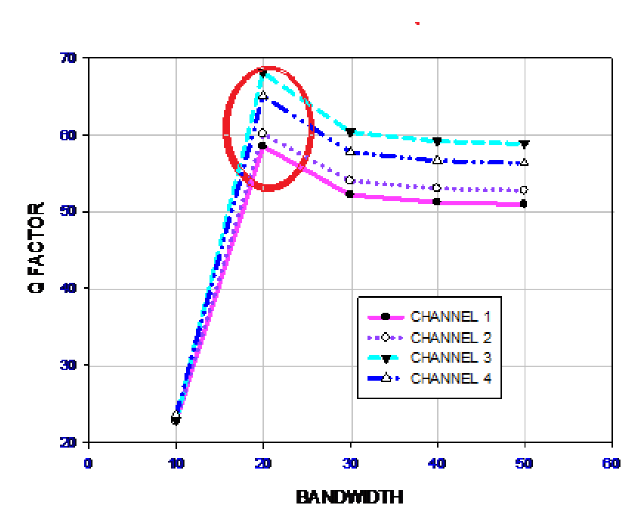


Fig. No. 3

Analytical study based on Q factor V/S bandwidth of the setup model for up stream

Similarly the plotting is additionally in serious trouble the up stream transmission of the model. At the ONU aspect rather than the utilization of the CW optical device the RSOA is employed. however as a mux and demux the AWG is most well-liked . The band-width of the AWG at the demux aspect is unceasingly modified so as to require the reading of the letter of the alphabet issue at the OLT aspect with the assistance of the BER instrument. The distinct reading of the information measure and also the letter of the alphabet issue is aforethought within the foam of the graph in fig. No (). From the higher than figure we have a tendency to conclude that, once the information measure tiny|is little|is tiny} the worth of the letter of the alphabet issue is additionally small. With the rise within the price of the band-width the valve of the letter of the alphabet issue is increasing. the utmost price of the letter of the alphabet issue is obtained at the fifty rate information measure

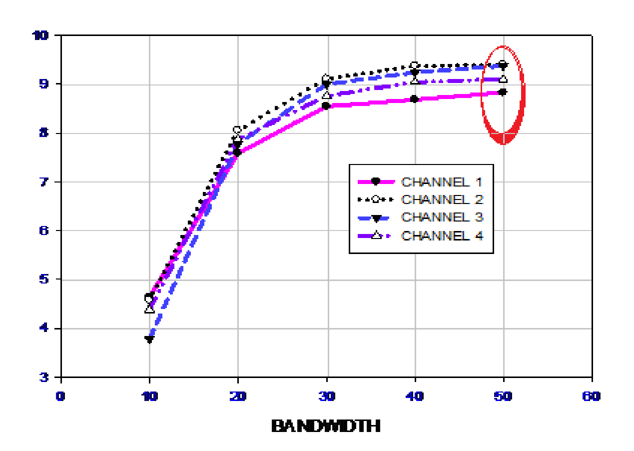


Fig. No. 4

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Comparative study of both upstream and down stream

The comparative plotting between the information measure v/s alphabetic character issue of the down-stream and also the up-stream is projected within the below mentioned fig. No() . Here it's clearly visible that the alphabetic character issue of the downstream is a lot of- much on top of that of the up-stream transmission. As, within the downstream transmission the employment of the CW optical maser is completed wherever as within the upstream transmission rather than exploitation the continual wave optical maser the RSOA is employed and also the biggest demerits of the RSOA is that when sure vary of the ability the RSOA potency reduces and at the sure purpose it stops operating. This result is clearly visible within the plotting of the each that's the upstream and also the downstream. 2 distinct color i.e. pink and also the black shows the downstream and also the upstream transmission of the four completely different channels.

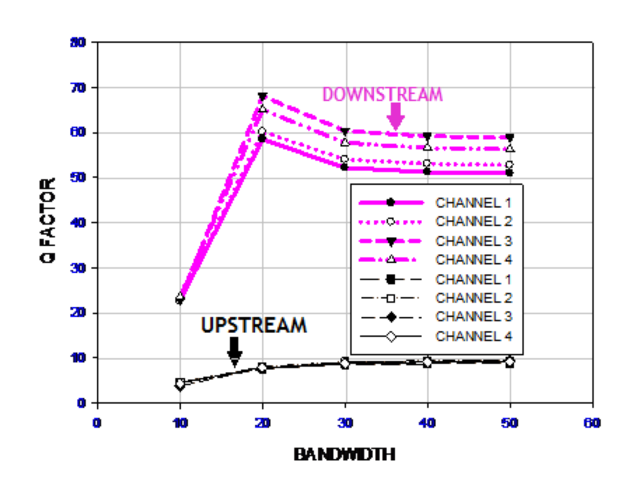


Fig. No. 5

Conclusion : We developed model during which the mux and dmux is replaced with the assistance of the AWGs. This device is extremely helpful in making an economical and compact PON system. The overall attenuation together with the opposite parameters like BER, alphabetic character issue OSNR also are calculated with the assistance of the created.

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